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**TURCK**

# LI...-Q25L...-IOLX3 Linear Position Sensors with IO-Link

IO-Link Parameters – IO-Link Version 1.1



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# 1 About This Manual

This manual describes the parameterization of devices using IO-Link. The manual contains general information on IO-Link and a list of the available parameters.

## 1.1 Target groups

These instructions are aimed at qualified personal and must be carefully read by anyone mounting, commissioning, operating, maintaining, dismantling or disposing of the device.

## 1.2 Explanation of symbols used

The following symbols are used in these instructions:



**DANGER**

DANGER indicates a dangerous situation with high risk of death or severe injury if not avoided.



**WARNING**

WARNING indicates a dangerous situation with medium risk of death or severe injury if not avoided.



**CAUTION**

CAUTION indicates a dangerous situation of medium risk which may result in minor or moderate injury if not avoided.



**NOTICE**

NOTICE indicates a situation which may lead to property damage if not avoided.



**NOTE**

NOTE indicates tips, recommendations and useful information on specific actions and facts. The notes simplify your work and help you to avoid additional work.



**CALL TO ACTION**

This symbol denotes actions that the user must carry out.



**RESULTS OF ACTION**

This symbol denotes relevant results of actions.

## 1.3 Other documents

Besides this document the following material can be found on the Internet at [www.turck.com](http://www.turck.com):

- Data sheet
- Instructions for use

## 1.4 Feedback about these instructions

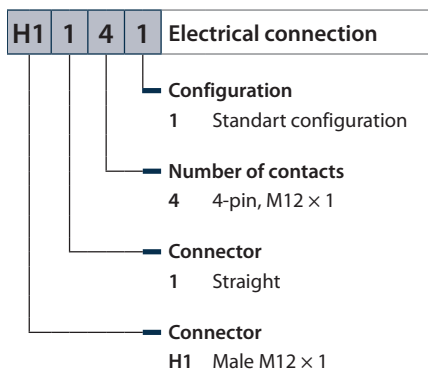
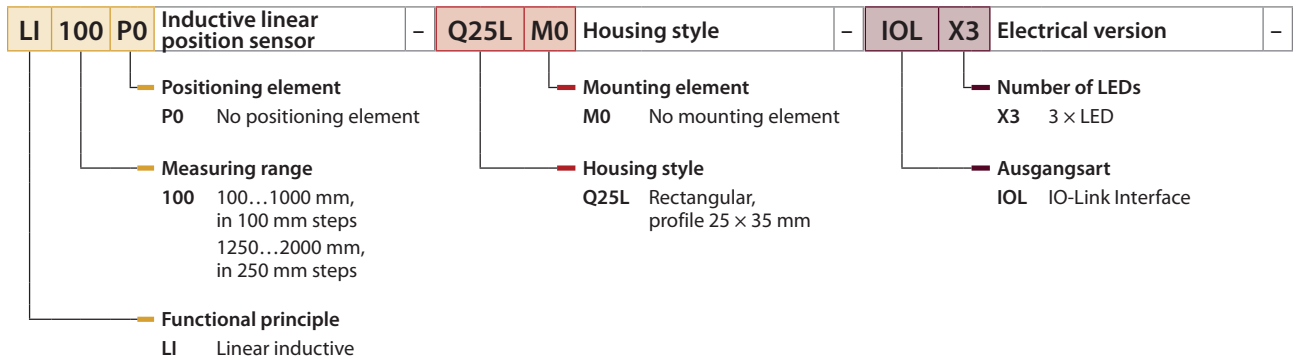
We make every effort to ensure that these instructions are as informative and as clear as possible. If you have any suggestions for improving the design or if some information is missing in the document, please send your suggestions to [techdoc@turck.com](mailto:techdoc@turck.com).

## 2 Notes on the Product

### 2.1 Product identification

These instructions apply to the following inductive linear position sensors:

**LI 100 P0 - Q25L M0 - IOL X3 - H1 1 4 1**



### 2.2 Turck service

Turck supports you with your projects, from initial analysis to the commissioning of your application. The Turck product database under [www.turck.com](http://www.turck.com) contains software tools for programming, configuration or commissioning, data sheets and CAD files in numerous export formats.

The contact details of Turck subsidiaries worldwide can be found on p. [▶ 13].

### 3 Software-Supported IO-Link Parameterization

The ports of the IO-Link master are configured in IO-Link mode (IOL).

In IOL mode, the IO-Link master tries to wake the connected IO-Link device via the "Wake-up Request". If the master receives a response from the IO-Link device, both devices start to communicate with each other. The communication parameters are exchanged first of all; the cyclic data exchange of the process data (process data objects) then starts.

When IO-Link communication (IOL mode) is active, both a cyclic and acyclic communication service is available.

There are two ways of setting the parameters via IO-Link:

- via on-request data objects (e.g. close to the PLC via IO-Link function block)
- via tool-based engineering via FDT/DTM (e.g. PACTware with the use of DTM or the IODD)

#### Device parameters (on-request data objects)

Device parameters are exchanged acyclically and on request of the IO-Link master. The IO-Link master always sends a request to the device first, then the device responds. This applies when the data is written into the device and also when read from the device. On-request data objects (ORDO) enable parameter values to be written into the device (write) or device states to be read from the device (read).

#### IO-Link configuration in PROFINET

SIDI (Simple IO-Link Device Integration) enables IO-Link devices in PROFINET applications to be configured directly in the programming environment (e.g. TIA Portal). The Turck IO-Link devices are integrated in the GSDML file of the TBEN, TBPN and FEN20 series IO-Link masters and can be set in the programming environment as submodules of a modular I/O system. The user has access here to all device properties and parameters.

## 4 IO-Link Parameters

### 4.1 General parameters

| Parameter                   | Content   |
|-----------------------------|---|
| Vendor ID                   | 317 (0x13D)   |
| Device ID                   | LI100...: 655873 (0xA0201)  |
|                             | LI200...: 655874 (0xA0202)  |
|                             | LI300...: 655875 (0xA0203)  |
|                             | LI400...: 655876 (0xA0204)  |
|                             | LI500...: 655877 (0xA0205)  |
|                             | LI600...: 655878 (0xA0206)  |
|                             | LI700...: 655879 (0xA0207)  |
|                             | LI800...: 655880 (0xA0208)  |
|                             | LI900...: 655881 (0xA0209)  |
|                             | LI1000...: 655882 (0xA020A)   |
|                             | LI1250...: 655883 (0xA020B)   |
|                             | LI1500...: 655884 (0xA020C)   |
|                             | LI1750...: 655885 (0xA020D)   |
| LI2000...: 655886 (0xA020E) |   |
| IO-Link version             | 1.1   |
| Bitrate                     | COM3  |
| Minimum cycle time          | 1 ms  |
| SIO supported               | False   |
| M-Sequence Capability       | PREOPERATE = TYPE_1_V with 8 octets on-request data<br>ISDU supported |
| Block Parameter             | True  |
| Data Storage                | True  |
| ProfileCharacteristic       |   |



## 4.2 Process input data

Two operating modes are available for displaying the process input data. The operating modes can be set via the **Mode** parameter (index 81 and 0x51). The default setting is mode 1. The following operating modes can be selected:

- Mode 1 – Normal mode (V1)
- Mode 2 – Compatibility mode (V3)

### Mode 1 - Normal mode (V1)

| Name           | Byte.Bit-offset | Bit length | Subindex access supported | Data Type | Value      | Description                   |
|----------------|-----------------|------------|---------------------------|-----------|------------|-------------------------------|
| bad signal     | 3.0             | 1          | False                     | Boolean   | False/true | No resonance coupling present |
| weak signal    | 3.1             | 1          | False                     | Boolean   | False/true | Resonance coupling weak       |
| out of range   | 3.2             | 1          | False                     | Boolean   | False/true | Leaving measuring range       |
| reserved       | 3.3             | 5          | False                     | UInteger  |            |                               |
| reserved       | 2.0             | 8          | False                     | UInteger  |            |                               |
| position value | 0.0             | 16         | False                     | UInteger  |            |                               |

### Mode 2 - Compatibility mode (V3)

| Name                    | Byte.Bit-offset | Bit length | Subindex access supported | Data Type | Value | Description                              |
|-------------------------|-----------------|------------|---------------------------|-----------|-------|--|
| Compatibility Mode (V3) | 0.0             | 32         | False                     | UInteger  | 0...0 | 1 digit corresponds to 1 micrometer (µm) |

### 4.3 Standard parameters

| Name                          | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access     | Byte. Bit-offset | Bit length | Data Type | Value      | Default | Description                         |
|-------------------------------|--------------|--------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|------------|---------|-------------------------------------|
| Min Cycle Time                | 0            | 0x0          | 3                | 0x3              | True                      | Read       | 2.0              | 8          | UInteger  |            |         |                                     |
| IO-Link Version ID            | 0            | 0x0          | 5                | 0x5              | True                      | Read       | 4.0              | 8          | UInteger  |            | 17      |                                     |
| Vendor ID 1                   | 0            | 0x0          | 8                | 0x8              | True                      | Read       | 7.0              | 8          | UInteger  |            |         |                                     |
| Vendor ID 2                   | 0            | 0x0          | 9                | 0x9              | True                      | Read       | 8.0              | 8          | UInteger  |            |         |                                     |
| Device ID 1                   | 0            | 0x0          | 10               | 0xA              | True                      | Read       | 9.0              | 8          | UInteger  |            |         |                                     |
| Device ID 2                   | 0            | 0x0          | 11               | 0xB              | True                      | Read       | 10.0             | 8          | UInteger  |            |         |                                     |
| Device ID 3                   | 0            | 0x0          | 12               | 0xC              | True                      | Read       | 11.0             | 8          | UInteger  |            |         |                                     |
| Standard Command              | 2            | 0x2          | 0                | 0x0              | True                      | Write      | 0.0              | 8          | UInteger  | 0...       |         | System command                      |
|                               |              |              |                  |                  |                           |            |                  |            |           | 130        |         | Device Reset                        |
|                               |              |              |                  |                  |                           |            |                  |            |           | 128        |         | Application Reset                   |
|                               |              |              |                  |                  |                           |            |                  |            |           | 129        |         | Restore Factory Settings            |
| Parameter (write) Access Lock | 12           | 0xC          | 1                | 0x1              | False                     | Read/write | 0.0              | 1          | Boolean   | False/true |         | Device access locks                 |
| Data Storage Lock             | 12           | 0xC          | 2                | 0x2              | False                     | Read/write | 0.1              | 1          | Boolean   | False/true |         | Device access locks                 |
| Local Parameterization Lock   | 12           | 0xC          | 3                | 0x3              | False                     | Read/write | 0.2              | 1          | Boolean   | False/true |         | Device access locks                 |
| Local User Interface Lock     | 12           | 0xC          | 4                | 0x4              | False                     | Read/write | 0.3              | 1          | Boolean   | False/true |         | Device access locks                 |
| Vendor Name                   | 16           | 0x10         | 0                | 0x0              | True                      | Read       | 0.0              | 512        | String    |            |         | Vendor name                         |
| Vendor Text                   | 17           | 0x11         | 0                | 0x0              | True                      | Read       | 0.0              | 512        | String    |            |         | Additional manufacturer information |
| Product Name                  | 18           | 0x12         | 0                | 0x0              | True                      | Read       | 0.0              | 512        | String    |            |         | Manufacturer's device designation   |
| Product ID                    | 19           | 0x13         | 0                | 0x0              | True                      | Read       | 0.0              | 512        | String    |            |         | ID                                  |
| Product Text                  | 20           | 0x14         | 0                | 0x0              | True                      | Read       | 0.0              | 512        | String    |            |         | Device category                     |
| Serial Number                 | 21           | 0x15         | 0                | 0x0              | True                      | Read       | 0.0              | 128        | String    |            |         | Device serial number                |
| Hardware Version              | 22           | 0x16         | 0                | 0x0              | True                      | Read       | 0.0              | 512        | String    |            |         | Hardware revision                   |
| Firmware Version              | 23           | 0x17         | 0                | 0x0              | True                      | Read       | 0.0              | 512        | String    |            |         | Firmware revision                   |
| Application Specific Tag      | 24           | 0x18         | 0                | 0x0              | True                      | Read/write | 0.0              | 256        | String    |            | ***     | Any user generated content          |

## 4.4 Parameters

| Name                            | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access     | Byte. Bit Offset | Bit length | Data Type | Value                                     | Default | Description  |
|---------------------------------|--------------|--------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|---|---------|--|
| Function Tag                    | 25           | 0x19         | 0                | 0x0              | True                      | Read/write | 0.0              | 256        | String    | NaN<br>...<br>NaN                         | ***     |  |
| Location Tag                    | 26           | 0x1A         | 0                | 0x0              | True                      | Read/write | 0.0              | 256        | String    | NaN<br>...<br>NaN                         | ***     |  |
| Offset to ZERO                  | 64           | 0x40         | 0                | 0x0              | True                      | Read/write | 0.0              | 32         | Integer   | NaN<br>...<br>NaN                         | 0       | (Only Normal mode)   |
| Teach offset to ZERO            | 65           | 0x41         | 0                | 0x0              | True                      | Write      | 0.0              | 1          | Boolean   | False/<br>true<br>True                    |         | (Only Normal mode)<br>Teach current position to Zero   |
| Errors                          | 70           | 0x46         | 0                | 0x0              | True                      | Read       | 0.0              | 8          | UInteger  | 0...3<br>0<br>1<br>2<br>3                 | 0       | No error<br>Bad signal<br>Weak signal<br>Out of range  |
| Operation Mode                  | 81           | 0x51         | 0                | 0x0              | True                      | Read/write | 0.0              | 8          | UInteger  | 1...3<br>1<br>3                           | 1       | Normal mode<br>Compatibility mode  |
| Damping time (Low-Pass) in ms   | 82           | 0x52         | 0                | 0x0              | True                      | Read/write | 0.0              | 16         | UInteger  | 0...<br>4095                              | 0       | (Only Normal mode)   |
| Offset to ZERO in $\mu\text{m}$ | 112          | 0x70         | 0                | 0x0              | True                      | Read/write | 0.0              | 32         | Integer   | NaN<br>...<br>NaN                         | 0       | (Only in Compatibility mode)   |
| Resolution (cut-off)            | 113          | 0x71         | 0                | 0x0              | True                      | Read/write | 0.0              | 32         | UInteger  | 5...<br>100<br>5<br>10<br>20<br>50<br>100 | 5       | (Only in Compatibility mode)<br>5 $\mu\text{m}$<br>10 $\mu\text{m}$<br>20 $\mu\text{m}$<br>50 $\mu\text{m}$<br>100 $\mu\text{m}$ |

| Name                  | Index (dec.) | Index (hex.) | Sub-index (dec.) | Sub-index (hex.) | Subindex access supported | Access     | Byte. Bit Offset | Bit length | Data Type | Value      | Default | Description                  |                                |
|-----------------------|--------------|--------------|------------------|------------------|---------------------------|------------|------------------|------------|-----------|------------|---------|------------------------------|--------------------------------|
| Moving Average Filter | 114          | 0x72         | 0                | 0x0              | True                      | Read/write | 0.0              | 32         | UInteger  | 0...8      | 0       | (Only in Compatibility mode) |                                |
|                       |              |              |                  |                  |                           |            |                  |            |           |            |         | 0                            | No Filter                      |
|                       |              |              |                  |                  |                           |            |                  |            |           |            |         | 2                            | 2 value moving average         |
|                       |              |              |                  |                  |                           |            |                  |            |           |            |         | 4                            | 4 value moving average         |
|                       |              |              |                  |                  |                           |            |                  |            |           |            |         | 8                            | 8 value moving average         |
| Teach offset to ZERO  | 120          | 0x78         | 0                | 0x0              | True                      | Write      | 0.0              | 1          | Boolean   | False/true |         | (Only in Compatibility mode) |                                |
|                       |              |              |                  |                  |                           |            |                  |            |           |            |         | True                         | Teach current position to Zero |

## 5 Turck Subsidiaries - Contact Information

|                      |  |
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